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/*
Course: CS 430 Fall 2004
Date: November 23, 2004
Language: Prolog
Compiler: PDProlog
Environment: Windows XP
Source Filename: family.pro

This program is designed to answer questions about relationships within
a given family tree. The program will tell you who the mother, father,
sister, brother, aunt, uncle, grandmother, grandfather, brother in law,
sister in law, mother in law, father in law, ancestor, and descendent
of someone is. The standard form is predicate(someone, relation).
where the relation will be the mother or father or so on.

*/

male(james1).
male(charles1).
male(charles2).
male(james2).
male(george1).
male(paul).
male(sam).

female(catherine).
female(elizabeth).
female(sophia).
female(claudia).
female(fay).

/* parent ( child, parent). */
parent(charles1, james1).
parent(elizabeth, james1).
parent(charles2, charles1).
parent(catherine, charles1).
parent(james2, charles1).
parent(sophia, elizabeth).
parent(george1, sophia).
parent(george1, sam).
parent(catherine, fay).
parent(charles2, fay).
parent(james2, fay).
parent(sophia, paul).
parent(elizabeth, claudia).
parent(charles1, claudia).

/* married ( A,B) - A is married to B */
married ( james1, claudia).
married( claudia, james1).
married(charles1, fay).
married(fay, charles1).
married(elizabeth, paul).
married(paul, elizabeth).
married(sophia, sam).
married(sam, sophia).
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/* rules */
/* Dad is the father of Child if he is male and is the child's parent */
father(Child, Dad) :- male(Dad), parent(Child, Dad).

/* Mom is the mother of Child if she is female and the child's parent*/
mother(Child, Mom) :- female(Mom), parent(Child, Mom).

/* Bro is the brother of Sibling if he is male and has the same parents as the
sibling*/
brother(Sibling, Bro) :- male(Bro), father(Sibling, Father), father(Bro,
Father), Bro \= Sibling,
                        mother(Sibling, Mother), mother(Bro, Mother).

/* Sis is the sister of Sibling if she is female and has the same parents as
the sibling*/
sister(Sibling, Sis) :- female(Sis), father(Sibling, Father), father(Sis,
Father), Sis \= Sibling,
                        mother(Sibling, Mother), mother(Sis, Mother).

/* Auntie is the aunt of Kid if she is female and a sister of the kid's parent
or
                        she is female and married to the kid's uncle

This is the definition of an Aunt as given by dictinoary.com :

    1. The sister of one's father or mother.
    2. The wife of one's uncle.

*/
aunt(Kid, Auntie) :- female(Auntie), parent(Kid, Parent), sister(Parent,
Auntie).
aunt(Kid, Auntie) :- female(Auntie), parent(Kid, Person), brother(Person,
Brother), married(Auntie, Brother).

/* Unclebuck is the uncle of Kid if he is male and a brother of the kid's
parent or
                        he is male and married to the kid's aunt

This is the definition of an Aunt as given by dictinoary.com :

    1. The brother of one's mother or father.
    2. The husband of one's aunt.

*/
uncle(Kid, UncleBuck) :- male(UncleBuck), parent(Kid, Parent), brother(Parent,
UncleBuck).
uncle(Kid, UncleBuck) :- male(UncleBuck), parent(Kid, Person), sister(Person,
Sister), married(UncleBuck, Sister).

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/* Grandmother is the grandmother of Grandchild if she is female and the
parent of the grandchild's parent */
grandmother(Grandchild, Grandmother) :- female(Grandmother),
parent(Grandchild, Parent), parent(Parent, Grandmother).

/* Grandfather is the grandfather of GrandChild if he is male and the parent
of the child's parent */
grandfather(Grandchild, Grandfather) :- male(Grandfather), parent(Grandchild,
Parent), parent(Parent, Grandfather).

/*
  BInLaw is the brother in law of SiblingInLaw
  You are the brother in law if: you are male and
                                The brother of one's spouse.
                                The husband of one's sister.
                                The husband of the sister of one's spouse
*/
brother_in_law(SiblingInLaw, BInLaw) :- married(SiblingInLaw, Person),
brother(Person, BInLaw).
brother_in_law(SiblingInLaw, BInLaw) :- sister(SiblingInLaw, Sister),
married(Sister, BInLaw).
brother_in_law(SiblingInLaw, BInLaw) :- married(SiblingInLaw, Person),
sister(Person, Sister), married(Sister, BInLaw).

/*
  SInLaw is the sister in law of SiblingInLaw
  You are the sister in law if: you are female and
                                The sister of one's spouse.
                                The wife of one's brother.
                                The wife of the brother of one's spouse.
*/
sister_in_law(SiblingInLaw, SInLaw) :- married(SiblingInLaw, Person),
sister(Person, SInLaw).
sister_in_law(SiblingInLaw, SInLaw) :- brother(SiblingInLaw, Brother),
married(Brother, SInLaw).
sister_in_law(SiblingInLaw, SInLaw) :- married(SiblingInLaw, Person),
brother(Person, Brother), married(Brother, SInLaw).

/*
  MInLaw is the mother in law of ChildInLaw
  You are the mother in law if: you are female and
                                your son is married to ChildInLaw or
                                your daughter is married to ChildInLaw
*/
mother_in_law(ChildInLaw, MInLaw) :- female(MInLaw), married(ChildInLaw,
Child), parent(Child, MInLaw).

/*
  FInLaw is the father in law of ChildInLaw
  You are the father in law if: you are male and
                                your son is married to ChildInLaw or
                                your daughter is married to ChildInLaw
*/

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*/
father_in_law(ChildInLaw, FInLaw) :- male(FInLaw), married(ChildInLaw, Child),
parent(Child, FInLaw).

/* Person is an ancestor of Descendent
   You are the ancestor if you are the parent of the person or
   you are the parent of the person's parent and so forth
*/
ancestor(Person, Ancestor) :- parent(Person, Ancestor).
ancestor(Person, Ancestor) :- parent(Person, Parent), ancestor(Parent,
Ancestor).

/* Person is a descendent of Ancestor
   You are the descendent if you are the child of the person or
   your parent is the child of the person and so forth
*/
descendent(Person, Descendent) :- parent(Descendent, Person).
descendent(Person, Descendent) :- parent(Descendent, Someone),
descendent(Person, Someone).
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